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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,085	04/11/2005	Hiroto Tamaki	925-319	2113
23117 7590 11/29/2007 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER KOSLOW, CAROL M	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 11/29/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/531,085

Applicant(s)

TAMAKI ET AL.

Examiner

C. Melissa Koslow

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26 and 28-31 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-25, 27 and 32-47 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/05, 8/05, 12/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference number 4 in figures 1 and 30; reference number 103 in figures 2A and 2B and reference number 211b in figure 26. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

There is no explicit teaching in the specification that the oxynitride is substantially Al-free. The specification teaches the lattice is a rhombic and the claimed teach it is orthorhombic. While these terms are synonyms, the terminology used the claims should be the same as that in the claims. Thus both should say rhombic or both should say orthorhombic.

Claims 6 and 10 are objected to because of the following informalities: The periods that appear in the middle of these claims need to be changed to commas. Appropriate correction is required.

Claims 21-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Pages 13-14 of the specification teaches the molar ratio of Sr to Ca or Ba is 6:4 to 9:1 and the molar ratio of Ca to Ba is 6:4 to 9:1. This ratio range is different from that in claims 21-23. This discrepancy between the claimed molar ratios and that disclosed in the specification need to be clarified.

Claims 3, 7, 11 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

These claims recite the limitations "said Group II elements in which Ba is essential" and "said Group IV elements in which Si is essential". There is insufficient antecedent basis for these limitations in the claims or in the claims from which they depend.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 6, 9, 14, 16, 18, 20, 24, 25, 32, 33, 35-37 and 39-47 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. patent 6,717,353.

This reference teaches an oxynitride phosphor having the formula $(\text{Sr}_{1-a-b-c}\text{Ca}_b\text{Ba}_c)\text{Si}_x\text{N}_y\text{O}_z:\text{Eu}_a$, where a is 0.002-0.2, b is 0-0.25, c is 0-0.25, x is 1.5-2.5, y is 1.5-2.5 and z is 1.5-2.5. This is the same formula as claim 6 and thus the phosphor must have an orthorhombic lattice system, a weight ratio of nitrogen to oxygen that falls within that claimed and the luminescent properties of claims 16 and 18, absent any showing to the contrary. Figure 1 should that the phosphor is excited by light having a wavelength of 490 or less. The amount of europium falls within that of claim 25 and thus it must have the property of claim 24. While the taught phosphor is produced by different process than that claimed, the resulting phosphors appear to be identical. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). The reference that the oxynitride phosphor emits green light. The reference teaches a white light emitting element comprising a UV emitting LED, the disclose oxynitride phosphor, a red phosphor and a blue phosphor. Thus the reference teaches a device having a

spectrum have peaks the ranges of claim 44. The reference teaches the claimed phosphor and device.

Claims 4, 7, 8, 15, 17, 19, 21-23, 34, 38 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,717,353.

As stated above, this reference teaches an oxynitride phosphor having the formula $(\text{Sr}_{1-a-b-c}\text{Ca}_b\text{Ba}_c)\text{Si}_x\text{N}_y\text{O}_z:\text{Eu}_a$, where a is 0.002-0.2, b is 0-0.25, c is 0-0.25, x is 1.5-2.5, y is 1.5-2.5 and z is 1.5-2.5. The amount of europium overlaps that claimed. The taught ranges of x, y and z encompass and overlaps those claimed. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The taught ratios of Sr to Ca, Sr to Ca and Ca to Ba overlap those claimed. When c is greater than 0, the reference suggests a Ba containing oxynitride and the resulting phosphor would be expected to have the luminescent properties of claims 15, 17 and 19, absent any showing to the contrary. In addition, when c is greater than 0, the reference suggests the claimed device which would have a spectra that has peaks in the claimed ranges and a Ra that falls within the claimed range. The reference teaches the LED is based on a Group III nitride based semiconductor. Thus one of ordinary skill in the art would have found it obvious to use any known Group II nitride based UV LED, which includes those containing indium. The reference suggests the claimed phosphor and device.

Claims 1-11, 13-20, 24, 25 and 32-47 are rejected under 35 U.S.C. 102(e) as being anticipated by WO 2004/030109.

This reference teaches oxynitride phosphors having the formula $\text{MSi}_2\text{O}_2\text{N}_2\cdot\text{Eu}$, where M is Ca, Ba, Sr or Ca and at least one of Ba and Sr or $\text{MSi}_{2-x}\text{Al}_x\text{O}_{2+x}\text{N}_{2-x}\cdot\text{Eu}$, where M is Ca, Ba, Sr or Ca and at least one of Ba and Sr and x is 0.01-0.15. The ratio of Eu to M is 0.02-0.15. These formulas falls within that of claims 6, 8 and 10 and thus has an orthorhombic lattice system. The taught amount of europium falls within that claimed. The taught molar ratio of N to O, when converted to weight ratio would fall within the claimed range. The phosphor is excited by light having a wavelength in the range of UV up to 470 nm. The reference teaches the phosphor emits light in the range of blue-green to yellow-green depending on M, where when M is Ba, the phosphor emits blue-green light. Since the taught phosphor has the claimed formula, it must have the properties of claims 18 and 19. While the taught phosphor is produced by different process than that claimed, the resulting phosphors appear to be identical. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). This reference teaches a white emitting device comprising this phosphor, a red phosphor and a blue emitting LED, such as a InGaN based one. This device would have spectra peaks in the claimed range and would have the claimed Ra when M is Ba. The reference teaches the claimed phosphor and device.

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2004/030109.

As stated above, the reference teaches M can be Ca with at least one of Sr and Ba. Thus it teaches M can be $\text{Ca}_{1-x-y}\text{Sr}_x\text{Ba}_y$, where $0 < x+y < 1$, $0 \leq x < 1$ and $0 \leq y < 1$. These ratios overlap the claimed ranges and thus suggests the claimed phosphor. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960).

Claims 26 and 28-31 are allowed.

Claim 27 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of an oxynitride phosphor having the formula $\text{LM}_2\text{Q}_T\text{O}_2\text{N}_{2+T}$, where L is at least one of Be, Mg, Ca, Sr, Ba and Zn; M is at least one of C, Si, Ge, Sn, Ti, Zr and Hf, Q is at least one of B, Al, Ga and In and $0 < T < 0.5$. The claimed process is not taught or suggested by the cited art of record. The cited art teaches using a carbonate for the L source and there is no suggestion in the art that the carbonate can be replaced with a nitride.

U.S. patent application publication 2005/0205845 is cited as of interest since it is the U.S. nation stage application for WO 2004/030109.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached at (571) 272-1233.

The fax number for all official communications is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

cmk
November 26, 2007


C. Melissa Koslow
Primary Examiner
Art Unit 1793